

ABSTRACT OF THE DISCLOSURE

A method of controlling an induction generator such as an automotive starter-alternator or a windmill is disclosed. The method comprises using a minimal number of current sensors and controlling at least one of a machine flux, an output voltage and generator torque, based on the stator or rotor flux magnitude and position. This method comprises the steps of measuring a plurality of current amounts in the generator; transforming the plurality of current amounts into a two phase reference system; measuring a DC voltage supplied to an inverter; measuring a plurality of voltage amounts in the generator using voltage sensors; transforming the plurality of voltage amounts into the two phase reference system; calculating a flux in the generator using the currents and the voltages obtained by said steps of transforming; comparing the calculated flux magnitude with a desired flux to determine a flux error amount; determining a d-axis voltage so as to reduce the flux error amount; determining a desired torque amount by obtaining a desired generator shaft torque amount and converting the desired generator shaft torque amount to the desired torque amount; comparing the desired torque amount with an estimated torque amount to determine a torque error amount; determining a q-axis voltage so as to reduce a torque error amount; and transforming the d-axis voltage and the q-axis voltage to stationary reference frame n-phase voltages

using the position of the flux, wherein  $n$  is substantially equal to a number of generator phases.

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